The Renewable Solutions Provider

Making a World of Difference

Air Conditioning

Air Conditioning & Building Services

MITSUBISHI ELECTRIC

Air Conditioning | Heating
Ventilation | Controls

The need for air conditioning

Today's commercial buildings are increasingly air tight and filled with heat generating office equipment and lighting, which presents a problem for anyone trying to maintain a stable and comfortable internal environment. With buildings accounting for around half of all UK greenhouse emissions, legislation is demanding higher standards of air quality and increased energy efficiency.

To reduce the impact of the built environment the challenge is to find cooling, heating and ventilation solutions that match energy efficiency with complete flexibility of design and control.

Our innovative and pioneering air conditioning systems offer more than double the efficiency levels of 10 -15 year old systems and can also be far more efficient than traditional methods of cooling and heating buildings, resulting in reduced running costs and lower carbon emissions.

Our new range of advanced, inverter driven chillers are set to challenge the traditional way of delivering cooling and heating. The highly efficient *e*-series modular chiller range is designed to answer the need for controllable, energy efficient cooling and heating with a host of advanced features and benefits.

Todays systems can simultaneously heat and cool different spaces to balance energy use across a building and sanitary hot water can even be supplied from the same system.

The name Mitsubishi is synonymous with excellence

Founded in 1921, Mitsubishi Electric is now a global, market leading environmental technologies manufacturer. In the UK, the Living Environmental Systems Division provides pioneering solutions that cool, heat, ventilate and control our buildings in some of the most energy efficient ways possible.

We believe that global climate challenges need local solutions. Our aim is to help individuals and businesses reduce the energy consumption of their buildings and their running costs.

Providing accurate and controlled comfort all year round, our air conditioning range can work on their own or in conjunction with hybrid systems. Whatever the requirement we offer a solution that matches the needs to almost any building.

At Mitsubishi Electric we have evolved and today we offer advanced environmental systems that really can **make a world of difference**.

Advanced air conditioning from Mitsubishi Electric delivers optimum comfort, reduced energy costs and minimal environmental impact

Legislation - solutions that answer the need for energy efficiency

In line with Government targets, changes to building regulations have been introduced to improve energy efficiency and reduce carbon emissions.

Part L

Through Part L, the Government aims to reduce CO_2 emissions from new commercial buildings by an average of 9% when compared against the 2010 standards.

This means that energy consumption has to be reduced as much as possible by reducing the heat lost from a building, thus making it more air tight and improving levels of insulation.

This in turn places increasing importance on the way air conditioning systems are designed, selected, installed and maintained with the key requirement for energy efficiency to help meet carbon reduction targets.

Mitsubishi Electric's advanced range of heat pump air conditioning units can transfer heat around a building to balance cooling and heating loads. Systems can also be added to reuse wasted heat for hot water supply, thereby removing the need for direct fossil fuel use on site that typically results in higher direct emission levels.

Part F

Part F of the Building Regulations focuses primarily on mechanical ventilation systems and indoor air quality. It covers all aspects of specifying and designing a mechanical ventilation system, giving guidance on installation, commissioning, operation and maintenance.

Minimum ventilation rates are advised within the document for non-domestic buildings with an air supply rate of 10 litres / second / per person being advised as a minimum for offices. Our mechanical ventilation with heat recovery units can help reduce overheating in buildings and decrease both cooling and heating loads.

Air Conditioning Inspections

The Energy Performance of Buildings Directive (EPBD) also requires commercial air conditioning systems to be independently assessed in detail.

The aim of the inspection is to provide building owners and managers with information on the efficiency of the air conditioning systems in their occupied buildings, as well as advise on how the performance of these systems could be improved.

The London Plan

In July 2011, the Mayor of London published The London Plan - an overall strategic plan for the UK's capital city.

The London Plan covers a broad range of important issues including transport, economics and the environment. London's response to climate change highlights air conditioning and overheating in buildings coupled with the effective use of mechanical ventilation systems.

Focussing on new build projects, the aim is to achieve an overall reduction in London's CO_2 emissions of 60% below 1990 levels by 2025. All London boroughs are expected to play their parts in achieving this goal. The plan sets carbon emission targets for new buildings which are expressed as improvements over the current Building Regulations.

These target reductions will be raised each year up to 2019 when new commercial buildings will have to be zero carbon.

CRC Energy Efficiency Scheme

The CRC (Carbon Reduction Commitment) Energy Efficiency Scheme is the UK's mandatory scheme to improve energy efficiency and cut CO_2 emissions in large public and private sector organisations. Those who fall within the scheme must reduce their emissions year on year and effective control of how these buildings are heated, ventilated and, where necessary, cooled, can significantly help achieve these reductions.

Carbon reduction targets for commercial buildings

Year	Improvement on 2006 Building Regulations
2010 - 2013	25%
2014 - 2016	31.5%*1
2016 - 2019	As per Building Regulation requirements
2019 Onwards	Zero carbon

*1 Based on 9% reduction required from the latest announcement.

Effecting change in how we cool, heat and ventilate our buildings

It is no longer right to supply more and more equipment to a leaky building. What is far more important is ensuring that we all work together to do the right thing. This means reducing the need for energy consumption in the first place, using energy as efficiently as possible with reduced equipment and loads, to finally supplying energy from zero or low carbon technologies.

At Mitsubishi Electric, we're aware of our ability to influence and improve how energy is used in the built environment. Our business objective is to engage all key players and to move towards viable lower carbon solutions.

As a manufacturer of energy-consuming equipment, we realise the important role that our products can play in keeping running costs and energy use to a minimum. We also understand how cooling, heating, ventilation and controls equipment interacts within a building and requires collaboration throughout its entire lifespan.

This is why we have developed two avenues to extend this collaboration, through integration within EDSL Tas building simulation software and providing Building Information Modelling (BIM) Revit files.The right equipment needs to be correctly sized and specified for use in appropriate buildings, optimised to perform to the highest standards and controlled and monitored throughout its working life to ensure maximum efficiency and minimum emissions.

We developed our Green Gateway philosophy to illustrate the importance of every stage of a product's life, from pre-purchase, design and specification, through installation, commissioning and maintenance, to end of life disposal. From responsible and sustainable manufacturing, right through to our comprehensive and free recycling programme, we are committed to ensuring that our products deliver the most energy efficient performance whilst minimising the impact on our environment.

The benefits of our air conditioning

As market leaders, we pride ourselves in providing high performance and competitive systems with low running costs.

By utilising heat pump technology our air conditioning units not only provide cooling, but also heating and often sanitary hot water. Heat pump technology requires only a small amount of electricity to harvest, upgrade and move heat from one location to another and providing heating and hot water as part of an integrated air conditioning system is far more efficient than traditional heating methods such as gas.

Outstanding benefits

- Efficient and extensive product range ideal for a variety of buildings, from small retail outlets, up to vast multi-storey office complexes
- Air conditioning units which can upgrade ‘free’ energy from a range of natural sources including air, ground and water
- Our pioneering technology has led the way over the last decade with advances in energy efficiency through inverter technology, refrigerant and compressor design and control solutions
- We measure and report true seasonal efficiency to provide accurate performance data
- Dedicated Partner Programme
- Reliable technical support at every step of the way

Ideal products that make a world of difference

There are two main types of air conditioning systems; Split-Systems which include the M Series and Mr Slim series, and Variable Refrigerant Flow (VRF) Systems which incorporate the City Multi range.

Split-Systems

Split-Systems are small and highly efficient. One outdoor unit can run up to eight indoor units in various models and capacities.

They are ideal for small to medium sized applications such as retail units, small offices, and meeting rooms.

M Series

Our M Series range is designed to cool or heat small spaces whilst providing a versatile, yet affordable air conditioning solution. The M Series is quick to install and includes one of the quietest units on the market.

Indoor units are available in a one to one combination and on Multi-Split MXZ systems, up to 6 indoor units can be connected to one outdoor unit.

Mr Slim

The Mr Slim range is suitable for cooling or heating a wide variety of premises such as offices or retail outlets.

Combine the high levels of efficiency with the complete versatility that this range has to offer and the possibilities are virtually endless.

The range offers Inverter, Standard Inverter models, top of the range Power Inverter models and Mitsubishi Electric's Zubadan systems to provide optimum performance at low ambient temperatures.

A range of capacities are available which can combine with a huge variety of indoor units including floor standing, wall mounted, ducted, ceiling cassette or ceiling suspended.

VRF Systems

VRF Systems can run numerous indoor units connected to one outdoor unit, making them suitable for medium to large buildings that demand high performance with optimum efficiency.

Our **City Multi VRF Systems** offer both heat pump and heat recovery technology. Heat pump systems deliver cooling or heating to a space, whereas heat recovery systems can simultaneously provide cooling and heating at the same time via separate indoor units, moving energy around a building for maximum efficiency.

The City Multi Y Series offers a simple and flexible solution where there is a demand for a changeover capability between heating and cooling for all indoor units, helping to ensure a constant and comfortable indoor climate. The City Multi R2 heat recovery system can provide simultaneous heating and cooling through only two pipes rather than the conventional three which are traditionally used on heat recovery systems, typically reducing installation time and material costs. Recovered energy can not only be moved around rooms within a building but can also be upgraded to heat water for sanitary use.

By transferring wasted heat in this way, substantial savings can be made on annual running costs and CO_2 emissions. With a range of over 80 indoor units of varying capacity including floor standing, ducted, ceiling cassettes, ceiling suspended and wall mounted types, up to 50 indoor units can be connected to one City Multi outdoor unit.

e-series Modular Chiller Range

Mitsubishi Electric's new *e*-series modular chiller range comprising of Cooling Only, Heat Pump and Heating Only models, provides the perfect solution to energy efficient, cost effective, low-carbon, controlled cooling or heating.

The *e*-series modular chiller uses two advanced DC inverter-driven scroll compressors in each 90kW module - taken from the VRF (Variable Refrigerant Flow) sector, to deliver a capacity range of 8% to 100%. The models deliver market-leading levels of efficiency with the ability for units to operate on their own or in tandem with others. The unique shape and modular design of the *e*-series means that the system can be constructed with up to six individual units connected together, to provide capacity of between 90kW and 540kW.

The importance of seasonal efficiency

Widely accepted by the industry, COP's (Coefficient of Performance) and EER's (Energy Efficiency Ratings) give a good indication of system performance, but in reality they simply do not give the full story of how a product will operate at different seasonal temperatures. Seasonal Efficiency, or SCOP and SEER take into account the efficiency at varying temperatures and partial loads throughout the year highlighting the huge benefit of Mitsubishi Electric's technology.

The Ecodesign Directive (ErP)

Air conditioning is regarded as a significant user of energy in buildings across the EU. Driving the visibility of seasonal efficiency, the Ecodesign Directive is focusing on air conditioning <12kW in a bid to reduce overall energy consumption, and to accelerate market transformation to more energy efficient products.

The Ecodesign Directive is now considering air conditioning >12kW, which will use minimum seasonal performance, maximum standby power and maximum sound levels for measuring and rating units. Current plans are to introduce this from 2017 with a view to improve seasonal efficiency. For further information visit the following website: **mitsubishielectric.eu/erp**

Adding further energy efficiency to a building

Ventilation

From ancillary products to added-value services, Mitsubishi Electric has an array of energy efficient solutions to enhance your building's energy use and running costs.

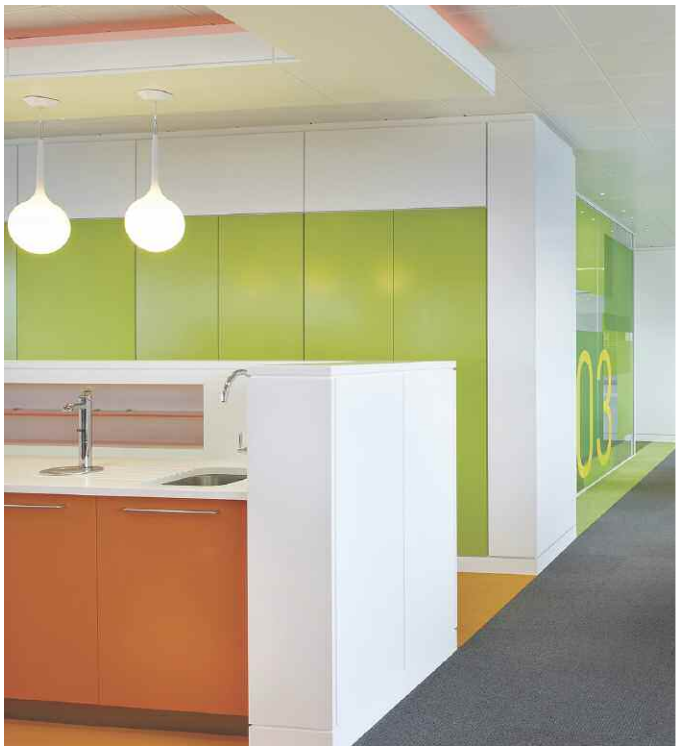
Finding ways to supply fresh air to a building in an energy efficient way is increasingly important and we meet this need with a range of ventilation products covering mechanical ventilation with heat recovery units (MVHR), air handling units (AHU's) and AHU control interfaces.

These systems have been designed to deliver a fresh air supply to a building whilst simultaneously extracting stale air in the most energy efficient manner possible through utilising heat recovery technology. Additionally, the Lossnay MVHR units and Lossnay Kanzen packaged AHU's can be integrated with both Mr Slim splits and City Multi VRF air conditioning systems.

'Heating Only' solutions

With legislation changing and increasing pressure to replace traditional heating systems with renewable sources of heat, the industry needs to be able to provide a wide range of innovative solutions.

Building on a comprehensive range of heating products, Mr Slim splits and City Multi VRF 'Heating Only' units offer a cost effective and efficient solution designed to combat challenging legislation and the need to reduce carbon emissions and running costs. Designed to deliver heat via the air, our full range of air conditioning products can also be adapted with the use of intelligent controls to run as Heating Only products.



Sanitary hot water

Mitsubishi Electric's heat pump boiler can be added to a heat recovery VRF System to utilise waste heat. The system upgrades this to heat sanitary hot water for bathrooms, showers or kitchens.

Hybrid VRF (H-VRF)

Our unique H-VRF system is the modern alternative to traditional methods of heating and cooling, offering unmatched performance and simultaneous cooling and heating with heat recovery.

H-VRF uses advanced refrigerant technology between the outdoor unit and the Hybrid Branch Controller (HBC). Energy is then transferred around the building using a pair of water pipes per fan coil that can supply hot or cold water. This significantly reduces refrigerant levels in occupied spaces, saves on resources required for installation and provides a more comfortable environment.

Heat pump air curtains

Air curtains are designed to allow open door trading in retail, hotel and leisure outlets by providing uninterrupted access for passing trade. They can provide significant energy savings, as they prevent conditioned air escaping from the building.

Mitsubishi Electric has partnered with Thermoscreens to offer carbon savings, easy installation and lower noise levels, through our range of heat pump air curtains. Rather than deriving warm air from conventional sources such as direct electric heating or low, medium or high pressure hot water, air curtains can be linked to VRF or Split heat pump air conditioning units, which significantly reduces the energy used.

The Enhanced Capital Allowance Scheme (ECA)

Qualified for Energy Technology List
www.eca.gov.uk

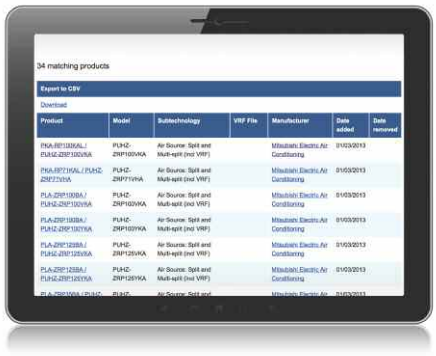
ECA is a Government tax incentive for businesses to invest in specific energy efficient technologies, such as ours.

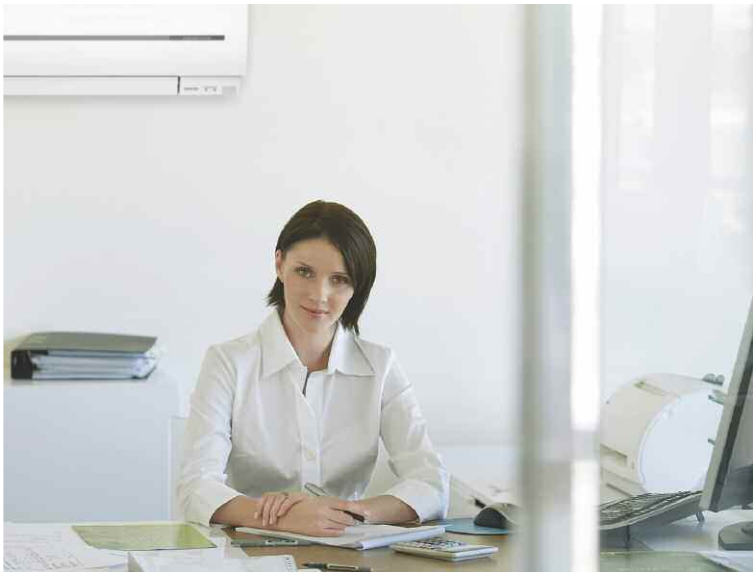
Under the scheme, all businesses liable for UK corporation tax are able to claim an Enhanced Capital Allowance on any qualifying expenditure, meaning businesses can offset the full cost of specific technologies against taxable profits of the period of the investment. Investment in new and unused plant and machinery qualify.

The scheme is managed by the Carbon Trust, who support businesses keen to save energy and reduce carbon emissions, through the use of energy efficient equipment and low carbon technologies. The trust has developed a criteria which targets the top 20% of highest performing heat pumps across the industry.

Mitsubishi Electric has developed a range of highly efficient systems which successfully qualify for ECA and are registered on the Energy Technology List.

For further information please visit the following website: **www.gov.uk/government/publications/enhanced-capital-allowance-scheme-for-energy-saving-technologies** and click on Mitsubishi Electric in the heat pump category.





Solutions that address the ban on R22 refrigerant

THE CASE FOR REPLACE

As of 1st January 2015 it became illegal to use R22 refrigerant*2 to service and maintain air conditioning units, yet there are estimated to be around 750,000*3 systems still in use that rely on R22.

Many of these building operators remain unaware that whilst their air conditioning will not be illegal to run, it may need immediate replacement if it requires maintenance involving any degassing of the system. Mitsubishi Electric is urging everyone involved to plan now on how they will handle the R22 issue.

The continual rise in energy costs also means everyone involved in the built environment is focusing on energy use and consumption and this is where modern equipment can really help to support replacement.

Mitsubishi Electric's **'The Case for Replace'** is full of key facts and viable solutions to help businesses adopt a sensible approach to the replacement of old air conditioning equipment using the Review, Replace, Recycle ethos. Our specially designed Audit Tool software allows existing and new systems to be compared to discover the potential benefits of replacement or upgrade. Looking at the differences in the efficiency of the equipment, the software calculates annual running costs, CO_2 emissions, spare parts and labour costs.

Many of our product ranges also incorporate our unique **'Replace Technology'** which allows the upgrade of systems using existing pipe work, without the need to apply any special cleaning machines.

For further information please visit the following website: **replace.mitsubishielectric.co.uk**

*2 The EC Ozone Regulation (No. 1005/2009) was introduced to control and phase out the remaining uses of all Ozone Depleting Substances (ODS) such as R22 refrigerant. This has led to a total ban on its use for service and maintenance by the start of the year 2015. ODS can result in greater UV radiation reaching the earth's surface which is harmful for humans, animals and plants, leading to increases in skin cancer, cataracts and a reduction in food crop yields. Modern alternatives such as HFC's, which include R410A, do not have the same ozone depleting potential (ODP).

*3 Mitsubishi Electric's estimate in 2012.

Whatever you do, take full control

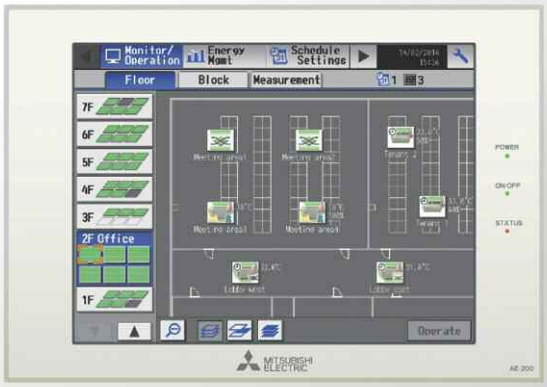
Good controls will benefit any application, large or small but with the huge choice of control systems available, careful consideration needs to be given to identify the correct control solution for each individual situation.

More flexible, intelligence based operation is increasingly demanded by customers, required by legislation and central to a solution's design. The enhanced capabilities that modern units offer to control cooling and heating systems and to anticipate, monitor and report their performance, provides massive opportunities to reduce energy use and running costs.

Local and central controllers offer a comprehensive range of functions and energy saving features such as set point limitation, detailed scheduling and night setback. These provide full flexibility of use, increased comfort and can dramatically reduce running costs and CO_2 emissions. Local controllers and optimal accessories can offer occupancy detection to further reduce CO_2 and running costs.

The controls will also highlight any errors or problems occurring within the equipment to assist a maintenance engineer. Central controllers offer user-friendly features such as Internet access and control, visible floor plans and remote monitoring, making it easier to get the most out of the system.

Mitsubishi Electric offers a versatile range of control products to complement both Split and VRF Systems



Control, Monitor, Report

Improving the control, monitoring, and data reporting of our cooling, heating and ventilation equipment is perhaps the single most impactful enhancement we can make. With today's increasingly predictive systems, the benefits are easy to achieve too.

Historically, the capital costs of equipment and installation drove purchasing decisions with few giving much thought to running costs. Now though, "fit and forget" is no longer an option if we are to deliver greener, more energy efficient and more economical buildings. Monitoring and reporting capabilities are also increasingly requested by customers with major energy needs and required by legislation and building regulations. Variables such as user habits, energy consumption patterns and outside temperature can now be used to inform system management and control.

Delivering the right information to the right people at the right time helps to speed-up interventions and to reduce undue energy use. Based on predictive algorithms, interventions can even be made automatically to ensure optimum performance is maintained at all times.

Air Conditioning Case Studies

Replace technology lowers office running costs by 22%

The Logic Group, based in Hampshire, specialises in the secure management of information and transactions across Europe.

Its offices, owned by the Advantage Property Income Trust Limited and managed on their behalf by London-based Valad Europe, are located on two sites in Fleet, Hampshire and these have been running R22 refrigerant air conditioning systems since their installation in 1998.

With the ban on R22 refrigerant, increasing levels of maintenance, and reduced system performance leading to higher energy costs, Valad was keen to upgrade the property's ageing systems. City Multi YJM Replace units were selected as the most cost effective way of replacing the existing R22 air conditioning with efficient R410A units.

> **"Energy efficiency and sustainability is important to Valad Europe, so is minimising our environmental footprint and we constantly strive to identify areas to improve our sustainability performance and look at ways of taking our assets to a more efficient and sustainable level."**
>
> Nigel Gray
> Valad Europe's Head of UK Asset Management

The Replace technology meant that all existing power cables could be re-used along with the pipework which only required minor modifications for the new connections needed for additional indoor units. This helped cut down on installation time and disruption whilst also saving on the amount of new materials required.

During normal operation the replacement units regulate the pressure of the new R410A refrigerant, which negates the need for new pipework and offers significant savings on cost and time.

AG150 touch screen centralised controllers were added to maximise energy efficiency, decrease energy usage and minimise running costs.

The introduction of fresh air to the offices via a low pressure hot water Air Handling Unit provides improved air quality and a more comfortable environment, whilst occupants also benefit from replacement indoor units that are quieter than previous models.

Following the upgrade, the energy consumption for one of the office buildings dropped by 22% and the other building which included adding significantly more equipment for a changed and upgraded application, had an annual reduction of 7% energy consumption.

The total estate saved **120,225kWh** over one year (or £15,630) significantly reducing their CO_2 output by **65.5 tonnes**

Shoppers benefit from heat recovery technology

When The Co-operative's food store in Dagenham needed to refurbish its cooling and heating system, the project presented the company with a few challenges.

The convenience store does not have a main gas supply and the old heating system was made up of an assortment of equipment including electrical and oil fuelled heaters. These were extremely inefficient and costly to run, and left some areas of the store cold whilst overheating others.

> **"In keeping with The Co-operative's environmental ethos we wanted a new system that would reduce the store's energy use and its CO_2 output whilst providing our customers and staff with a comfortable shopping environment. Any work involved had to be carried out quickly and quietly and create the least possible disruption to our trading."**
>
> Nick Cairns,
> The Co-operative's Regional Energy and Environment Manager

The solution was a system linking the PWFY heat pump boiler to a City Multi VRF R2 heat recovery system to provide both cooling and heating and sanitary hot water to the premises.

The space-saving R2 units were fitted outside the building and linked to indoor ceiling cassettes to ensure an even and pleasant temperature throughout the store.

Linking the air conditioning with the PWFY boiler makes the most effective use of any excess heat from the air conditioning and can achieve a flow temperature of 70ºC, reducing energy usage and costs for the store. Pre-piped water connections to flow and return headers also help to make installation quick and easy, whatever the application.

Before installing the new system the Dagenham store was using 306,989kWh of energy a year at a cost of £33,769, plus a further £3.5K spend on oil.

The new system uses just 267,677kWh per annum at a cost of £29,444, which means The Co-Operative is using **39,312kWh less energy** providing them with a **saving of £7,825** over previous bills.

Premium comfort for busy cosmopolitan hotel

London Kings Cross St. Pancras Premier Inn is a busy hotel hosting an eclectic mix of tourists and business clients from all over the world. On site is a bar, six meeting rooms, a pub, a restaurant and 276 bedrooms.

Guest comfort is the top priority for any good hotel and one of the biggest reasons guests return, so getting it right is vital. Premier Inn goes one step further and offers a money back guarantee to guests who have a legitimate complaint about any aspect of their stay, so the company is focused on offering the best possible conditions and customer service.

A comfortable room temperature is an essential part of their customer care package, but when you play host to people from all over the globe, one fixed temperature simply doesn't do the job. To achieve the optimum comfort for every guest, whatever their usual climate, Premier Inn has installed a high efficiency, heat recovery City Multi system. This is able to respond to the changing requirements for cooling and heating in the most energy efficient way possible.

The system is operated by the unique centralised controller, Melcotel™, which has been specifically designed for use in the hotel sector. The controller works with or without a key card, so whenever a room is activated the system switches to a temperature pre-set by the hotel which can be altered according to their requirements.

A sensor fitted to the controller monitors the temperature in unoccupied rooms and if it rises above or falls below a set range, the unit activates to either cool or heat the room. Keeping the room temperature at a constant level allows guests to achieve their desired temperature in a much faster time.

Windows can also be connected to the system so if a guest opens a window in the bedroom the system automatically switches off to save energy.

> "For us the system offers reduced energy usage, lower running costs, and a decrease in carbon emissions, without compromising a guest's comfort."

Mitesh Panikker
Property Supply Chain Manager for Whitbread Hotels & Restaurants, owners of the Premier Inn brand

Energy efficient, low carbon technology helps achieve 'Very Good' BREEAM rating for new school

When Warrington Borough Council decided to develop a new urban village, it wanted an innovative, ultra-modern primary school building at its heart that was able to demonstrate the council's commitment to sustainable living.

Key to the £4.3 million building project was a low-impact design which used advanced, renewable, energy efficient equipment to keep the school environment fresh and comfortable for both staff and pupils.

The Council's vision also called for a state-of-the-art building that would be fit for purpose for many years to come and central to this was the requirement for a building that could achieve an energy efficient BREEAM rating of 'Very Good'. BREEAM promotes low impact design and minimising a building's energy demands with the use of energy efficient, low carbon technologies.

Fresh air is supplied to the Lossnay mechanical heat recovery ventilation and Ecodan CAHV air source heat pump boilers provide the school's hot water and heating.

Mr Slim air conditioning units are used to deliver efficient cooling and heating to heat spots around the building including the general offices, the staff room, head's office and server room.

Built with the support of the local education department, the new school has a gross floor area of 2,219m^2 and includes 14 classrooms.

These are now home to the 420 staff and pupils who attend the newly created Chapelford Village Primary School having relocated to the new building from an aging facility nearby known as Sycamore Lane Primary.

Mr Slim is one of Britain's best-selling air conditioning split systems offering complete versatility which makes it suitable for a huge variety of applications.

The decision to place the school at the heart of its new Chapelford Urban Village in Warrington, has enabled the local authority to develop a state-of-the-art facility which will not only enhance pupils' learning experience, **but will also provide cost effective, low carbon community facilities for the surrounding area**.

Global gym chain uses R22 issue to enhance experience for club members

When Fitness First needed to upgrade the air conditioning in its Oxford Circus club, the company needed to find a way to minimise disruption to both its club members and the business.

The Central London site in Great Marlborough Street had an ageing R22 air conditioning system and was earmarked for an upgrade as part of the company's programme to tackle the R22 phase out.

> **"We not only had the R22 issue to deal with but we were also aware that modern air conditioning systems can increase the efficiency levels in each club helping to reduce both running costs and emissions."**
>
> Glyn Allen
> Fitness First

In all,14 indoor air conditioning units needed to be replaced and this is where Mitsubishi Electric's unique City Multi Replace system came into its own as it meant that Fitness First could reduce installation costs by retaining the majority of the copper piping throughout the building.

The Replace technology cleans the existing pipework system and allows it to be re-used so that internal disruption is kept to a minimum and the refurbishment can generally be completed in days rather than weeks.

The Oxford Circus site also now benefits from the greater efficiency levels that modern City Multi air conditioning offers which means lower running costs for the club.

"Everything we do is about creating a clean and cool environment for our club users so it was important to us as a group that we tackled the R22 issue in a controlled way but also found ways to reduce our carbon emissions," explained Glyn Allen.

Mitsubishi Electric Nagoya Works

When Mitsubishi Electric was looking to build a new production facility for its range of factory automation products at the company's Nagoya Works, located in Aichi Prefecture, Japan, the need for energy efficiency was paramount to match the company's ambitious carbon reduction targets.

The production facility plays a key role in meeting the growing global demand for reliable, high-quality factory automation products and like all modern buildings, it is constructed to the highest standards of air tightness and insulation.

The 26,000 square metres of floor space throughout the six storey building needs to be comfortable for staff and visitors alike, as well as incorporating the most advanced energy-efficient measures possible.

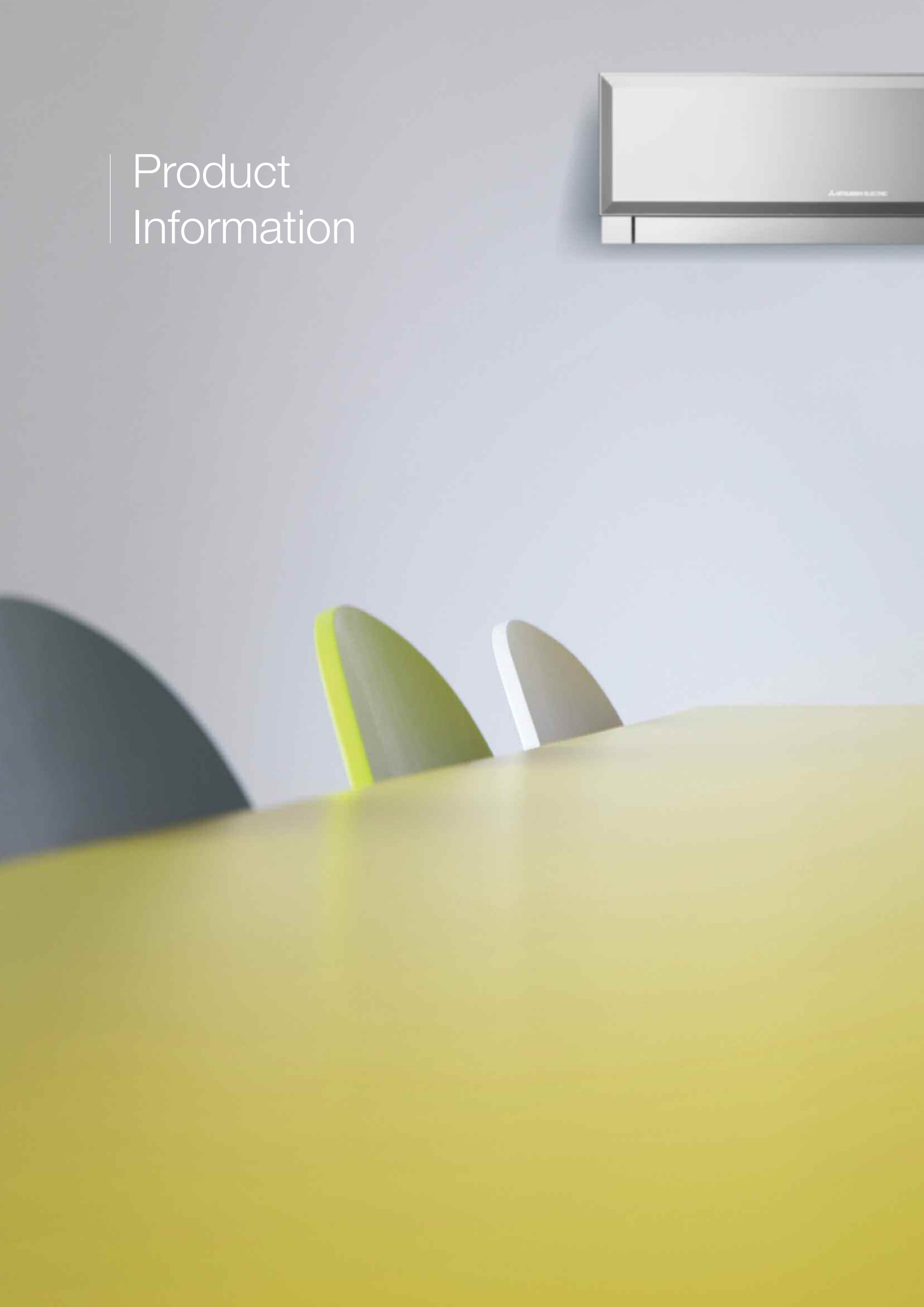
In addition to a 50kW photovoltaic system on the roof, low voltage LED lighting and comprehensive energy management systems, the factory is also benefiting from the installation of 48 of the company's *e*-series chiller range - which brings a modern, low carbon update to traditional standard chiller technology.

The controls for the high-efficiency *e*-series modular chiller range at Nagoya Works have been easily integrated into the Building Energy Management Systems (BEMS) system so that they can operate smoothly alongside the Air Handling Units and VRF air conditioning, to maximise efficiency.

In addition to delivering 4.3MW of cooling and heating to the building, the modular approach of the *e*-series range reduced both space and weight on the rooftop and the in-built header pipes simplified the design and installation.

The ability to position units as close as 900mm apart has also ensured easy access for maintenance.

Product Information



M Series Range

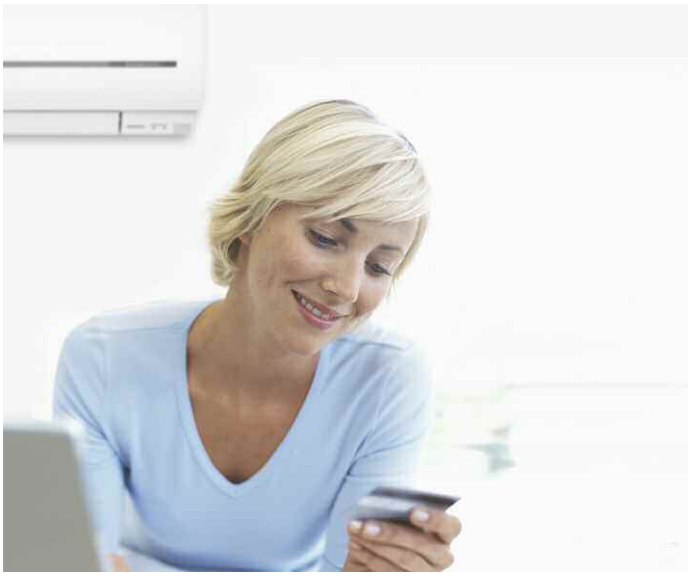
Designed to cool or heat small to medium sized applications, the M Series splits range provides a versatile, efficient, yet affordable air conditioning solution.

Quiet and quick to install, this attractive range offers the perfect way to ensure a comfortable environment with the minimum of disruption.

Available in single or Multi-split configuration, the M Series is a flexible range offering an attractive solution for cooling or heating a building.

Wall Mount Systems

- Cost effective Classic Inverter series
- Inverter series designed to suit popular demand
- Stylish Zen indoor series in black, silver or white
- Top of the range High COP Inverter series

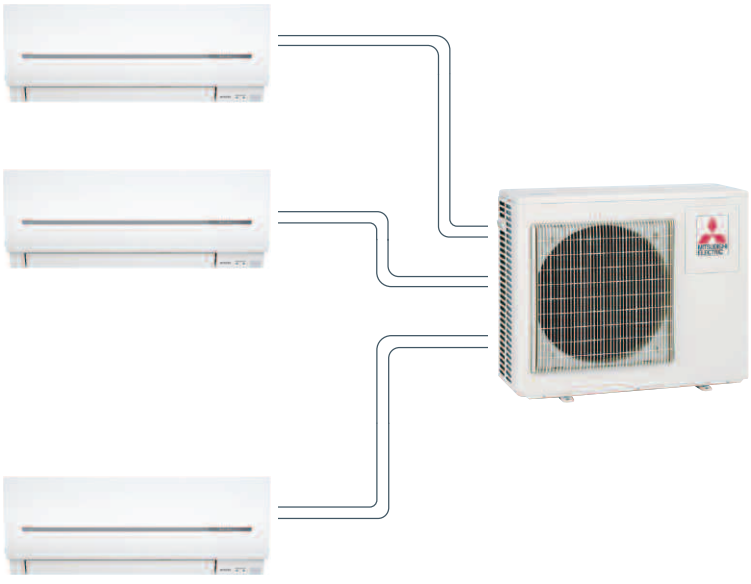


Floor Mount Systems

- Extremely versatile
- Designed for wall installation at floor level
- Compact design makes installation easy
- 3 models available including 2.5kW-5.0kW

Multi-Split Systems

- Between 2-6 indoor unit connections from 1 outdoor unit
- M Series or Mr Slim cassette, ducted, floor, ceiling or wall mounted indoor units
- 6 models available including 5.3kW-12.2kW



M series

Indoor Model	Range		2.0kW*4	2.5kW	3.5kW	5.0kW	6.0kW	7.1kW
Wall Mount	Classic MSZ-DM			■	■			
	Inverter MSZ-SF		■	■	■	■		
	Inverter MSZ-GF						■	■
	Stylish Zen MSZ-EF*5			■	■	■		
	High COP MSZ-FH			■	■			
Floor Mount	Inverter MFZ-KJ			■	■	■		

*4 Multi-split only. *5 Also available in silver and white.

Outdoor Model	Range		Indoor Units	5.3kW	5.4kW
Multi-splits	MXZ-2D53VA		2	■	
	MXZ-3D54VA2		2-3		■
	MXZ-4D72VA		2-4		
	MXZ-4E83VA		2-4		
	MXZ-5E102VA		2-5		
	MXZ-6D122VA		2-6		

7.2kW	8.3kW	10.2kW	12.2kW
■			
	■		
		■	
			■

Mr Slim Range

Suitable to cool or heat a huge variety of applications such as offices and retail units, the Mr Slim range is one of Britain's best selling air conditioning split-systems.

Combine the efficiency with the complete versatility that this range has to offer and the possibilities are virtually infinite.

INVERTER | POWER INVERTER | ZUBADAN

Inverter

- Inverter cassette range only
- Single combination only
- Available in single & three phase outdoor units
- Inverter models from 7kW to 14kW

Standard Inverter

- High quality cost effective Standard Inverter
- Available in single and three phase outdoor units
- S Series models from 2.5kW-7kW available with four way blow cassettes, ducted or ceiling mounted indoor units
- Standard Inverter models from 10kW-22kW available with four way blow cassettes, ducted, floor, wall or ceiling mounted indoor units

Power Inverter

- Top of the range Power Inverter technology optimised for high seasonal efficiencies
- Available in single and three phase outdoor units
- 9 models available from 3.5kW-22kW
- Available with four way blow cassettes, ducted, floor, wall or ceiling mounted indoor units

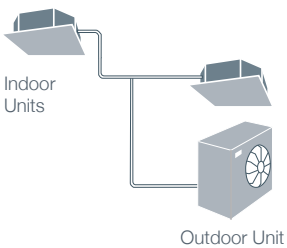
Zubadan Inverter

- Optimal performance at low ambient temperature conditions
- Quicker defrost and improved start up in heating*6
- Available in single and three phase outdoor units
- 2 models available from 10kW-12.5kW
- Available with four way blow cassettes, wall or ceiling mounted indoor units

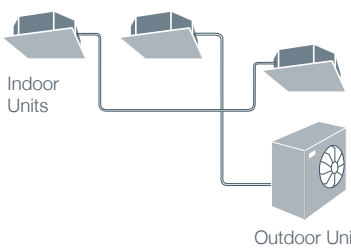
Twin, Triple and Quad Combinations

The multi-split system is an ideal option for open plan spaces in medium sized premises such as offices or shops, where two, three or four units are required from one outdoor unit.

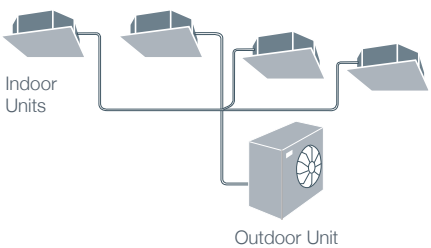
Twin



Triple



Quadruple

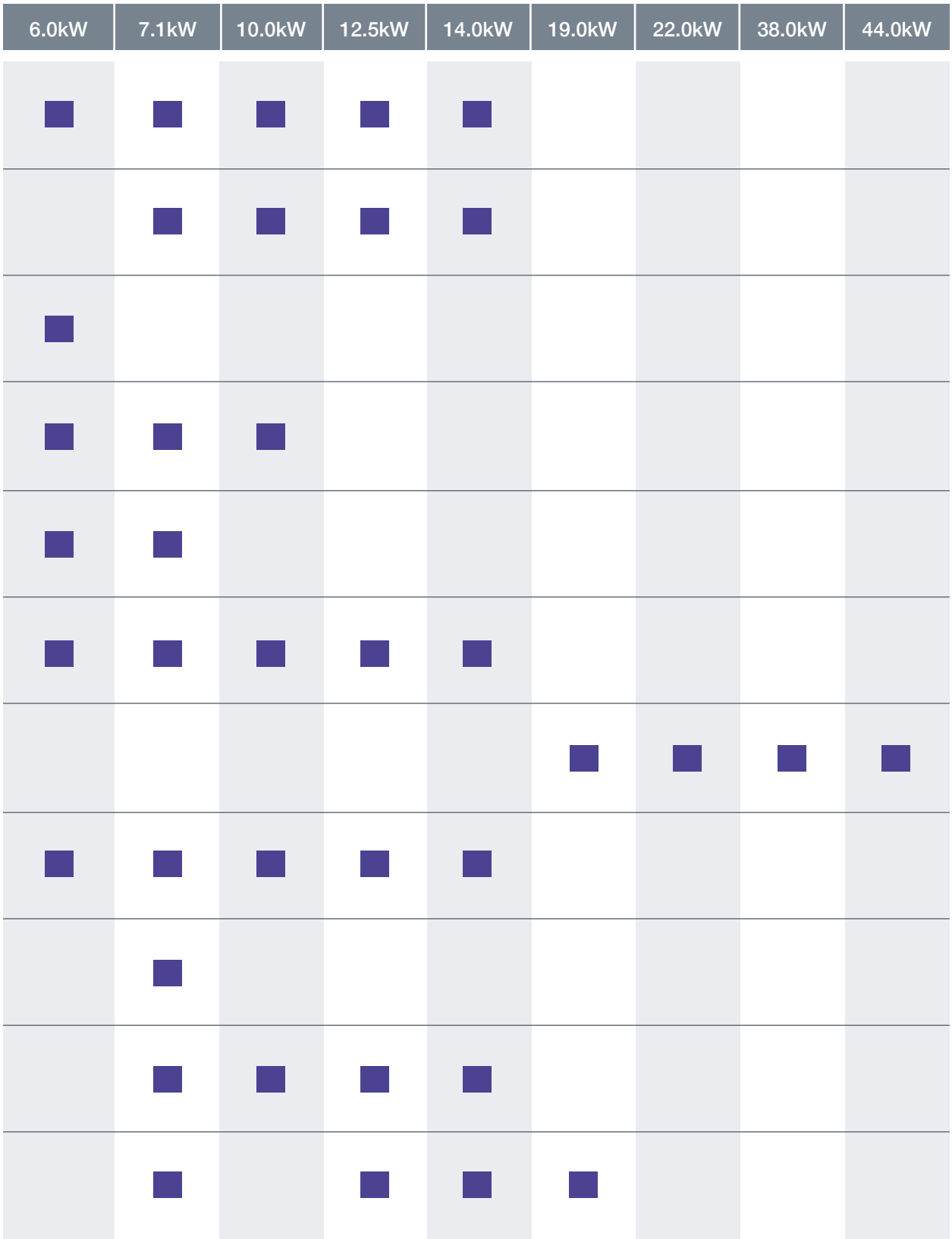


*6 Will work effectively even when the outdoor ambient air temperature is -25°C. At -20ºC, max heating capacity is achieved in about 20 mins.

Mr.SLIM

Indoor Model	Range		2.5kW	3.5kW	5.0kW
Cassette	4-Way Blow PLA-(Z)RP			■	■
	4-Way Blow PLA-SP				
	4-Way Blow Small SLZ-KF 600x600		■	■	■
Wall	Wall Mounted PKA-RP			■	■
Ducted	Slim Ceiling Concealed SEZ-KD			■	■
	Ceiling Concealed PEAD-RP			■	■
	Ceiling Concealed PEA-RP				
Ceiling	Ceiling Suspended PCA-RP				■
	Stainless Ceiling Suspended PCA-RP-HAQ				
Floor	Floor Standing PSA-RP				
Air Curtain	Air Curtain HP DXE*7				

*7 Available as recessed or exposed versions.


6.0kW
7.1kW
10.0kW
12.5kW
14.0kW
19.0kW
22.0kW
38.0kW
44.0kW

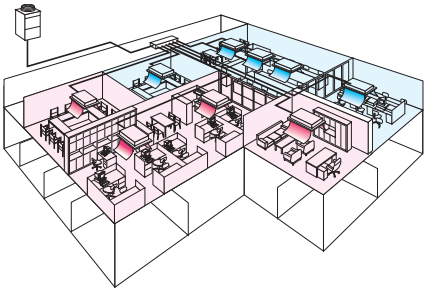
City Multi Range

The City Multi range is Mitsubishi Electric's answer to large scale VRF (Variable Refrigerant Flow) applications.

The technology of City Multi is second to none and offers excellent seasonal energy efficiency, low running costs and reduced CO_2 emissions.

Air Cooled

- Wide range of heat pump options
- 2 pipe heat recovery through branch controller
- Available in standard low footprint, or high efficiency variants
- Specific models designed to replace any R22 VRF systems and utilise existing piping, wiring and power
- Zubadan systems available for best heating performance at low ambient



Water Cooled

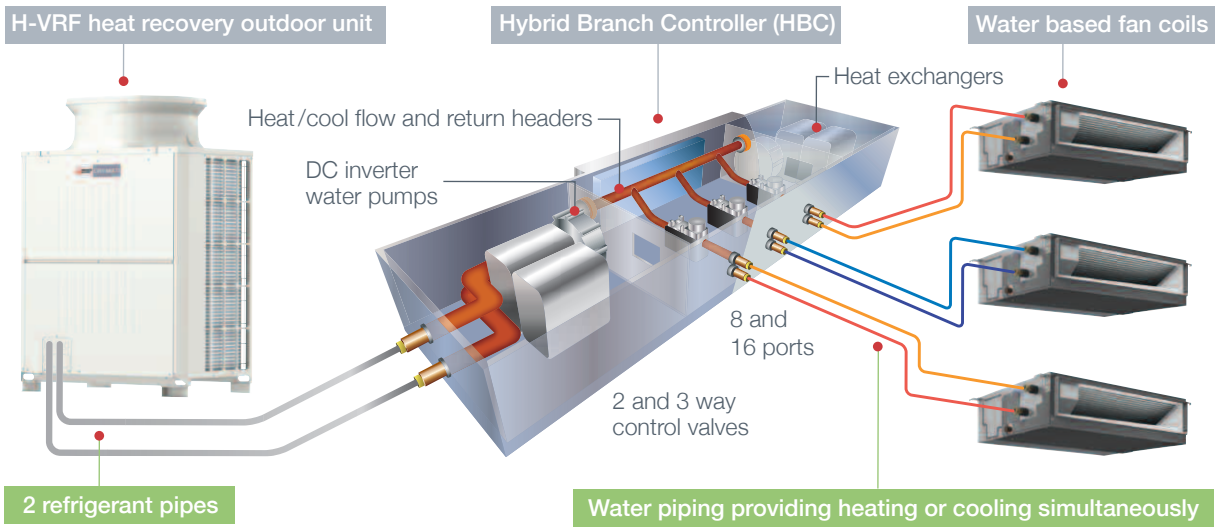
- Available in heat pump and heat recovery
- Applicable to standard water systems or ground source systems
- Small, quiet condensers situated indoors
- Offers double heat recovery through refrigerant and water circuit

Close Control

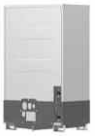
- Specially designed high sensible cooling solution
- Inverter driven with high efficiencies
- Close control of temperature ±1°C
- Quick recovery after power failure and back up and rotate
- Connectable to air or water cooled VRF heat pump systems

Hybrid VRF (H-VRF)

Set to rival traditional cooling and heating, the new H-VRF system delivers optimum comfort and efficiency, using an innovative combination of unique 2-pipe technology and water to provide simultaneous heating and cooling with heat recovery.



CITY MULTI

Range		Model	P112 12kW	P125 14kW	P140 16kW	P200 22kW	P250 28kW	P300 34kW	P350 40kW	P400 45kW
Air Cooled	Heat Pump	**New** Standard PUMY-P	■	■	■	■				
		New Standard PUHY-P				S	S	L	L	L
		New High Efficiency PUHY-EP (YLM)				S	S	L	L	XL
		Replace PUHY-RP				S	S	S	S	S S
		Zubadan PUHY-HP				S	S		S	S
	Heat Recovery	**New** Standard PURY-P				S	S	L	L	L
		New High Efficiency PURY-EP (YLM)				S	S	L	L	XL
		Replace PURY-RP				L	L	L		
Water Cooled	Heat Pump	**New** WY Series PQHY-P (YLM)				■	■	■	■	■
	Heat Recovery	**New** WR2 Series PQRY-P (YLM) 				■	■	■	■	■

P450 50kW	P500 56kW	P550 63kW	P600 69kW	P650 73kW	P700 80kW	P750 85kW	P800 90kW	P850 96kW	P900 101kW	P950 108kW	P1000 113kW	P1050 118kW	P1100 124kW	P1150 130kW	P1200 136kW	P1250 140kW
XL	XL	L S	L S	L L	L L	L L	XL L	XL L	XL XL	L L S	L L L	L L L	L L L	XL L L	XL L L	XL XL L
XL	XL	L S	L L	S S S	L S S	L S S	L L S	L L S	L L L							
S S	S S	S S	S S	S S	S S S	S S S	S S S	S S S	S S S							
XL	XL	L S	L L	L L	L L	L L	L L	XL L	XL XL							
XL	XL	L S	L L	L L	L L	XL L	XL XL	XL XL	XL XL							

S Small chassis (920mm wide) L Large chassis (1220mm wide) XL Extra Large chassis (1750mm wide)

CITY MULTI

Indoor Model	Range		P15 1.7kW	P20 2.2kW	P25 2.8kW	P32 3.6kW
Cassette	4-Way Blow PLFY-P-VBM-E					■
	4-Way Blow Small 600x600 PLFY-P-VFM-E			■	■	■
	1-Way Blow PMFY-P-VBM-E			■	■	■
Ducted	Slim Ceiling PEFY-P-VMS1-E		■	■	■	■
	Ceiling Concealed PEFY-P-VMA-E			■	■	■
	High Static Ceiling PEFY-P-B-VMH(S)-E					
Ceiling	Ceiling Suspended PCFY-P-VKM-E					
Wall	Wall Mounted PKFY-P-VBM-E		■	■	■	
	Wall Mounted PKFY-P-VHM-E					■
	Wall Mounted PKFY-P-VKM-E					
	Wall Mounted Zen MSZ-EF*8					
Floor	Floor Standing Ducted PFFY-P-VLRMM-E*9			■	■	■
	Floor Standing Chassis PFFY-P-VLEM-E			■	■	■
	Floor Standing PFFY-P-VKM-E			■	■	■
Fresh Air	Outdoor Air GUF-RD4					■
Water Heater	Hot Water Generation PWFY-PVM-E-BU					
Air Curtain	Air Curtain HP VRF-HP-DXE*10					

*8 Only available when using PAC-LV11 LEV kit interface, available in black, silver and white. *9 Available with or without static pressure.
*10 Available as recessed or exposed versions.

H-VRF Indoor Units

Model	Range		P15 1.7kW	P20 2.2kW	P25 2.8kW	P32 3.6kW	P40 4.5kW	P50 5.6kW
Ducted	Slim Ceiling PEFY-WP-VMS1-E		■	■	■	■	■	■
	Ceiling Concealed PEFY-WP-VMA-E			■	■	■	■	■
Floor	Floor Standing High Static PFFY-WP-VLRMM-E			■	■	■	■	■
Cassette	4-Way Blow PLFY-WP-VBM					■	■	■

Note: H-VRF system can only be configured with H-VRF, HBC and indoor units.

P40 4.5kW	P50 5.6kW	P63 7.1kW	P80 9.0kW	P100 11.2kW	P125 14.0kW	P140 16.0kW	P200 22.4kW	P250 28.0kW
■	■	■	■	■	■			
■	■							
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Close Control

Model	Range		P250 28kW	P500 56kW
Down Flow Floor Standing	PFD-P250VM-E		■	
	PFD-P500VM-E			■

Note: PFD is only available to connect with PUHY-P250YJM and PQHY-P250YHM heat pump systems.

e-series Modular Chiller Range

Mitsubishi Electric's new *e*-series modular chiller range comprising of Cooling Only, Heat Pump and Heating Only models, provides the perfect solution to energy efficient, cost effective, low-carbon, controlled cooling or heating.

Benefits include:

High efficiency

The *e*-series modular chiller range uses highly efficient scroll compressor technology from our City Multi VRF units, along with advanced inverters and controls to deliver exceptional efficiency and wide operating range.

Unique modular approach

Up to six individual units can be connected together to provide a system capacity from 90kW to 540kW. Using this modular approach reduces space requirements and simplifies lifting and installation.

e-series

Reduced plant space

Each 90kW module can be positioned in a row of up to six connected units using the same internal header. For larger systems it is possible to have the units facing each other with a gap of **only 900mm service space**.

Low noise levels

By utilizing inverter driven compressors and fans within a uniquely shaped chamber the *e*-series modular chiller range offers market leading low noise levels as standard.

Exceptional features

With the new *e*-series modular chiller range, we have examined every single component to find ways of increasing performance, reliability and overall system efficiency.

A. High efficiency inverter compressor

Two advanced DC inverter-driven scroll compressors are incorporated within each 90kW module. This gives a capacity range of 8% to 100% for each module.

B. Two-stage cooling circuit

Both compressors serve separate plate heat exchangers located in the centre of the unit. By modulating the evaporating temperature individually, overall system efficiency can increase by an additional 3.9%, compared to single evaporating refrigeration cycles.

C. Fan inverter control

Each of the two refrigerant circuits has three separately controlled, inverter-driven DC fans, allowing for more precise control to save energy and optimise system efficiency.

D. U-shaped high performance compact air heat exchanger

The use of U-shaped heat exchangers allows for a greater surface area whilst also keeping the *e*-series modular chiller range units much narrower than conventional chillers. Blue Fin anti-corrosion coating on the heat exchanger is also provided as standard.

E. Front service

Access for the control box and other service parts is located at the front of the unit to ease service and maintenance regimes.

F. Fans

The fan blades have improved ventilation characteristics and a newly designed rear edge that suppresses wind turbulence to increase efficiency and reduce noise levels.

G. Internal header pipe

The in-built internal header pipes simplify design, installation and maintenance and makes the *e*-series modular chiller range suitable for almost any situation.

H. Digital indicator

A dedicated digital indicator inside the PCB displays high pressure, low pressure, water inlet temperature, water outlet temperature, error codes etc., thereby aiding service and maintenance.

Partner Programme

Designed to raise industry standards, Mitsubishi Electric's Partner Programme assures end users of a consistently high level of installation and after sales service that supports our systems.

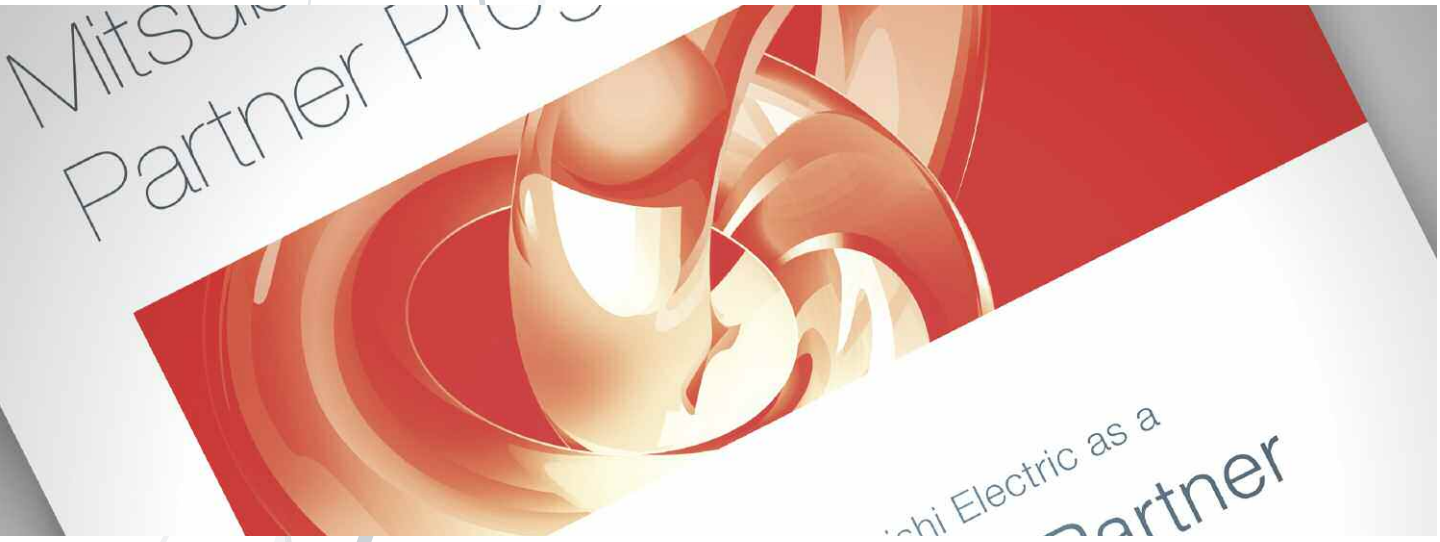
Established since 2005, our Partner Programme is inclusive and open to all qualifying companies installing air conditioning. Using the world-renowned Mitsubishi Electric brand, we train, facilitate and promote all qualifying companies to help raise industry standards and improve working methods.

As the need for improved energy efficiency continues to grow, so too does the demand for the advanced solutions that we and our Partners are able to provide. Our aim is to help individuals and businesses reduce the energy consumption of their buildings and the running costs of their heating,cooling and ventilation. Our Partners play a major role in the delivery of this goal.

The Mitsubishi Electric Partner Programme is uniquely based upon an agreed set of documented standards for Installation, Commissioning and Maintenance*11 - assuring the ultimate level of customer service and support from Mitsubishi Electric and our Partners.

In today's world however, technical standards alone are not enough. As market leaders, we feel that we must also look at the standards we adopt in the way in which we do business. We consider Health & Safety issues and Corporate Social Responsibility (CSR) policies to be just as important to the end-user. This is why that, in addition to adhering to our technical standards, our Partners are required to uphold given industry standards and to support the principles of our Green Gateway philosophy.

All Partners are reviewed on a regular basis to ensure they continue to meet the required standards that makes them eligible to be part of the Mitsubishi Electric Partner Programme.



*11 As set out in Mitsubishi Electric's MELSmart Technical Services "Installation Commissioning & Aftercare Standards".

MELSmart™ Technical Services

For any building's services to run efficiently and effectively, it is essential that equipment is designed correctly, specified and installed to the highest standards, into buildings that are as thermally efficient as possible.

On-going maintenance programmes also need to include effective monitoring and reporting and plans need to include a full end-of-life programme. At Mitsubishi Electric, we have developed a comprehensive range of technical services, training and backup that ensure you of the highest quality support at every step of the way.

With a technical department that's second-to-none, MELSmart offers a comprehensive range of support, from spare parts to commissioning, 24/7 telephone help desk and system design, and a team of experts that are on hand 365 days a year to support you when you need it most.

Our new ME Engineer app allows you to access all the important service information for air conditioning, heating, ventilation and controls all in one place via your smartphone or tablet. The app is available to download from iTunes, Google Play and the Windows App Store.

We are constantly investing in our MELSmart Technical Services department to ensure that our customers can enjoy the highest level of support possible. Our dedicated department include the following invaluable support:

- Design and build
- 24/7/365 out of hours technical helpline
- Spares department
- Warranty claims department
- On-site services
- Commissioning our air and water products
- Troubleshooting
- Maintenance and diagnostic health checks
- Free air conditioning Audit Tool service
- State of the art training

MELSMART
TECHNICAL SERVICES

Responsible, sustainable manufacturing

ENVIRONMENTAL VISION 2021 TECHNOLOGY & ACTION

Green Gateway

www.greengateway.mitsubishielectric.co.uk

Mitsubishi Electric UK's commitment to the environment

As a leading provider of environmental technologies, Mitsubishi Electric prides itself on using responsible, sustainable manufacturing processes that take energy use, efficiency and the impact on the environment very seriously.

Our production facilities are committed to sustainable business practices such as energy and resource efficiency, minimising ecological impacts and reducing greenhouse gas emissions.

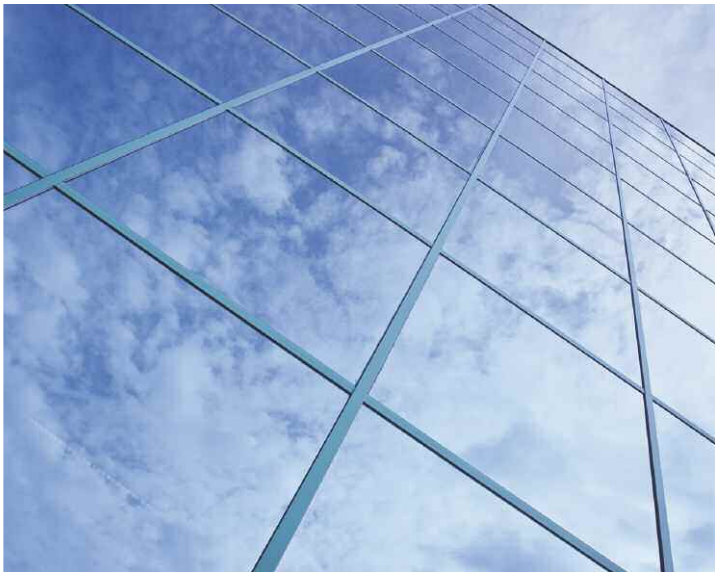
In line with our aim to improve all round performance and energy efficiency throughout all our operations, we set and adhere to the highest environmental standards to protect the world in which we live.

Global Environmental Vision 2021

Mitsubishi Electric's Global Environmental Vision 2021 sets a goal for a lower emission future that influences all our policy decisions. For further information visit the following website: **mitsubishielectric.com/eco**

Green Gateway

Green Gateway is Mitsubishi Electric Living Environmental System's commitment to the environment. It strives to instill positive changes in Mitsubishi Electric's own operations as well as seeking to influence those of its customers. For further information visit the following website: **greengateway.mitsubishielectric.co.uk**



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Air Conditioning & Building Services

FSC LOGO

Green Gateway

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Mitsubishi Electric UK's commitment to the environment

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Mitsubishi Electric Living Environmental Systems UK

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